

Honors Chemistry SLO Review

Nomenclature:

- | | | |
|----------------------------|---------------------------|------------------------|
| 1. CaCl_2 | 11. AlBr_3 | 21. Radium Oxide |
| 2. AlCl_3 | 12. Ca_2C | 22. Barium Phosphide |
| 3. BaF_2 | 13. K_2O | 23. Aluminum Bromide |
| 4. BeO | 14. Cs_2O | 24. Aluminum Sulfide |
| 5. Na_2S | 15. SrI_2 | 25. Aluminum Nitride |
| 6. AlP | 16. Sodium Chloride | 26. Barium Fluoride |
| 7. Na_3P | 17. Strontium Sulfide | 27. Lithium Oxide |
| 8. Cs_2S | 18. Magnesium Fluoride | 28. Sodium Iodide |
| 9. Mg_3P_2 | 19. Rubidium Iodide | 29. Beryllium chloride |
| 10. CsF | 20. Cesium Sulfide | 30. Strontium Nitride |

Name the following Compounds:

- | | | |
|-----------------------------|-----------------------------|---------------------------|
| 31. NiCl_2 | 39. HgO | 45. Copper I Oxide |
| 32. NiCl_3 | 40. CdS | 46. Copper II Oxide |
| 33. CoCl_2 | 41. Cd_3P_2 | 47. Zinc II Iodide |
| 34. CrN | 42. WF_5 | 48. Lead IV Sulfide |
| 35. Cr_2O_3 | 43. W_2O_5 | 49. Tin II Nitride |
| 36. Ag_2O | | 50. Tin IV Nitride |
| 37. FeCl_3 | | 51. Gold I Sulfide |
| 38. FeCl_2 | | 52. Tungsten V Iodide |
| 54. Scandium III Nitride | | 53. Zirconium IV Fluoride |

Write the Names:

56. Cs_2S
57. SrBr_2
58. VCl_2
59. FeO
60. Fe_2O_3

Name the following

Write the formulas:

44. Iron II Bromide
55. Scandium III Bromide

61. NiO

62. Ni_2O

63. MgS

Write the formulas:

64. Platinum IV Sulfide

65. Potassium Bromide

1. NaNO_3

2. $\text{Ba}(\text{CN})_2$

3. Li_2SO_4
4. K_3PO_4
5. $\text{Cs}(\text{C}_2\text{H}_3\text{O}_2)$
6. $\text{Mg}(\text{NO}_2)_2$
7. CaCO_3
8. $\text{Sr}_3(\text{PO}_4)_2$

Name the following

19. Ni_2SO_4
20. $\text{Cd}(\text{OH})_2$
21. ZnSO_3
22. ScPO_4
23. $\text{Pb}(\text{CN})_4$

Name the following:

35. $\text{Co}(\text{NO}_3)_2$
36. $\text{Ca}(\text{NO}_3)_2$

Write the formula:

42. Potassium nitrate
43. Iron II sulfate
44. Iron III sulfate

Name the following:

51. MgO
52. $\text{Sr}(\text{NO}_3)_2$
53. $(\text{NH}_4)_2\text{S}$
54. Na_3P
55. Cu_3P
56. Cu_3PO_4
57. $\text{Cd}(\text{OH})_2$

9. NaHCO_3
10. KOH

Write the formula

11. Barium chlorate
12. Magnesium acetate

24. $\text{Cr}_2(\text{CO}_3)_3$

25. $\text{Sn}(\text{CH}_3\text{COO})_4$

26. NH_4NO_3

27. $(\text{NH}_4)_2\text{O}$

28. Nickel II Nitrite

29. Iron III chlorate

37. PbSO_4

38. NH_4CN

39. $(\text{NH}_4)_3\text{PO}_4$

45. Strontium phosphate

46. Aluminum chlorate

47. Copper I carbonate

48. Lead II nitrate

58. BaCO_3

Write the formula:

59. Silver I nitrate
60. Sodium carbonate
61. Cobalt II nitrite
62. Ammonium sulfide
63. Ammonium phosphate

13. Barium Sulfate
14. Potassium chlorite
15. Sodium hydroxide
16. Magnesium hydroxide
17. Calcium phosphate
18. Aluminum phosphite

30. Titanium IV sulfate

31. Lead II carbonate

32. Lead IV carbonate

33. Silver I phosphate

34. Tungsten V phosphite

40. $\text{Hg}(\text{OH})_2$

41. $\text{Bi}_2(\text{SO}_4)_3$

49. Lead IV nitrate

50. Sodium acetate

64. Ammonium hydroxide

65. Iron III chloride

66. Magnesium oxide

67. Potassium perchlorate

68. Zinc II chlorite

69. Scandium III nitrite

70. Barium bicarbonate

71. Lead II oxide

72. Lead II hydroxide

73. Lead IV oxide

74. Lead IV hydroxide

**Naming Molecular Compounds
(podcast 3)**

1. N_2O_5

2. CO_2

3. C_2O_4

4. P_4O_{10}

5. Cl_4

6. CCl_4

Write the Formula (podcast 3)

7. Carbon Tetrabromide

8. sulfur hexafluoride

9. Selenium disulfide

10. Arsenic triiodide

11. silicon tetrabromide

12. Nitrogen triiodide

13. Selenium pentafluoride

1. List the following atoms in order of increasing electronegativity:

a. Cr, Ni, Ga, K

b. P, As, F, Hg, Fr

2. List the following atoms in order of increasing atomic radius:

a. Cr, Ni, Kr, Ga, K

b. P, As, F, Hg, Fr

3. List the following atoms in order of increasing ionization energy:

a. Cr, Ni, Kr, Ga, K

b. P, As, F, Hg, Fr

5. For each of the elements listed below, complete the following:

a. long hand electron configuration

b. orbital diagram (boxes with arrows)

c. short hand electron configuration (begins with a noble gas)

1. Li

2. Na

3. K⁺

4. B

5. Cr

6. Ne

7. Cu

1. If an electron goes from level 4 to level 2 what happens? Be specific.
 2. Identify the two particles found in the nucleus of an atom.
 3. What is meant by ground state and excited state for electrons?
 4. What is an electron? What are **valence** electrons? What is the octet rule?
 5. The Mg⁺², and the Na⁺¹ ions each have ten electrons surrounding the nucleus. Which ion would you expect to have the smaller radius?
 6. Identify the major families (groups) on the periodic table. Choose one element from each group and draw the Lewis and Bohr diagrams.
1. What type of atoms combine to form a covalent bond?
 2. What type of atoms combine to form a ionic bond?
 3. What type of atoms combine to form a metallic bond?
 4. Give two examples of a covalent compounds?
 5. Give two examples of a ionic compounds?

6. Give two examples of a metallic compounds?
7. Describe how a covalent bond forms between two atoms. How are these different than ionic bonds?
8. In an ionic bond, the valence electrons are _____.
9. In a metallic bond the valence electrons form a _____
10. Rank the bonds (ionic, covalent, metallic) in order from strongest to weakest.
11. Classify each of the following compounds as either: Ionic, Covalent, Metallic.

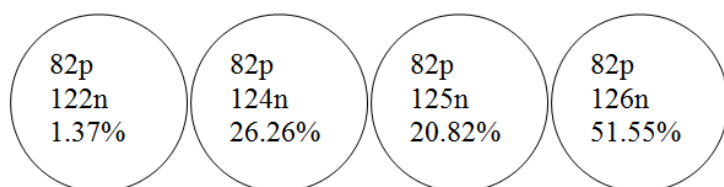
- | | |
|--|-------|
| a. H ₂ O | _____ |
| b. NaCl | _____ |
| c. MgSO ₄ | _____ |
| d. CsCl | _____ |
| e. Fe | _____ |
| f. Hg | _____ |
| g. He | _____ |
| h. Ca ₃ (PO ₄) ₂ | _____ |
| i. NH ₄ Cl | _____ |
| j. NH ₃ | _____ |
| k. P ₂ O ₅ | _____ |
| l. Ag | _____ |
| m. AgNO ₃ | _____ |
| n. AgCl | _____ |
| o. Titanium | _____ |
| p. Barium Phosphate | _____ |
| q. Sulfur Dioxide | _____ |
| r. Bromine | _____ |
| s. Tungsten V Bromide | _____ |

Complete this table.

Atomic Number	Mass number	Number of protons	Number of neutrons	Number of electrons	Symbol of element
9			10		
		14	15		
	47		25		
	55	25			

Isotopes and Average Atomic Mass

1. Name two ways that isotopes of an element differ.
2. What data must you know about the isotopes of an element to calculate the atomic mass of the element?
3. The four isotopes of lead are shown below, each with its percent by mass abundance and the composition of its nucleus. Using these data, calculate the approximate atomic mass of lead.



State the number of electrons either lost or gained in forming each ion.

- a. Br^-
- b. Na^+
- c. As^{3-}
- d. Ca^{2+}

Write the Formula for These Acids

1. sulfuric acid
2. nitric acid
3. hydrochloric acid
4. acetic acid
5. hydrofluoric acid

Answer the following:

	Charge	Location in Atom
Particle		
Proton		
	Neutral	
	Negative	

6. Isotopes of an element have the same number of _____ but a different number of _____.

7. Describe the relationship between elements in the same family (column).

8. Convert 34 degrees Celsius to degrees kelvin.

2. Classify each of the following as a physical or chemical change.

	Physical	Chemical
Bending a piece of wire.		
Burning coal		
Cooking a steak		
Cutting grass		
Vinegar and baking soda mixing.		

3. How do you know that each of these is a chemical change?

	Reason
Food spoils	
A foaming antacid tablet fizzes in water.	
A ring of scum forms around your bathtub.	
A firecracker explodes	

Question 1: Three scientists measure the standard meter bar kept at the International Bureau of Standards. Their measurements are 1.09 m, 1.09 m, and 1.08 m. Are their measurements accurate, precise, or both? Why?

Question 2: Differentiate between intensive and extensive properties of matter. Give some examples.

Part A: Balance the following reactions and indicate whether they are *synthesis* or *decomposition* reactions.

- $\text{SO}_3 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4$ Type: _____
- $\text{H}_2\text{O} \rightarrow \text{H}_2 + \text{O}_2$ Type: _____
- $\text{HgO} \rightarrow \text{Hg} + \text{O}_2$ Type: _____
- $\text{Al}_2\text{O}_3(\text{s}) \rightarrow \text{Al}(\text{s}) + \text{O}_2(\text{g})$ Type: _____
- $\text{P} + \text{O}_2 \rightarrow \text{P}_2\text{O}_5$ Type: _____

Part B: Predict the products and indicate type (include states):

1. $\text{KBr} \rightarrow$ Type: _____

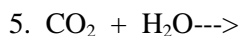
2. $\text{Li} + \text{Cl}_2 \rightarrow$ Type: _____



Type: _____



Type: _____



Type: _____

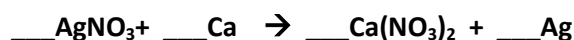
ACID/BASE Q1: Compare and contrast the Arrhenius definition of an acid/base and the Bronsted Lowry definition. Give an example for both types of definitions for both an acid and a base (4 total). Write the net ionic equation for each of your examples indicating if the percent dissociation is partial or complete.

Acid/Base Q2: Draw the pH scale and label a strong acid, weak acid, neutral, strong base and weak base.

Acid/Base Q3: Using knowledge from your titration lab, explain how acid/base reactions are reversible. In your answer be sure to discuss the dissociation of ions.

Stoichiometry/Mole:

1. How many grams of water are formed when 12.5-g of hydrogen reacts with oxygen?
2. How many moles of calcium nitrate are formed when 5.6 moles of silver I nitrate react with solid calcium?

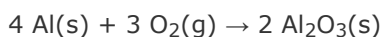


3. How many grams of calcium nitrate are formed when 7.4 moles of silver I nitrate react with solid calcium?
4. Carbon disulfide is an important industrial solvent. It is prepared by the reaction of coke with sulfur dioxide:
$$\underline{\hspace{1cm}} \text{C(s)} + \underline{\hspace{1cm}} \text{SO}_2(\text{g}) \rightarrow \underline{\hspace{1cm}} \text{CS}_2(\text{s}) + \underline{\hspace{1cm}} \text{CO(g)}$$
 - a. How many moles of CS_2 form when 6.3 mol of C reacts?
 - b. How many moles of carbon are needed to react with 7.24 moles of SO_2

5. How many atoms of hydrogen are present in 5.5 grams of water? (2-step mole)

6. A sample of diphosphorous tetrafluoride contains 5,995,000,000,000 molecules. How many grams would this sample weigh?

7. According to the following reaction, how many grams of aluminum are needed to make 28.0 grams of aluminum (III) sulfide?



Gases Q1. The pressure of air in an automobile tire is 2.0-atm at 27° C. At the end of a journey on a hot sunny day the pressure has risen to 2.2-atm. What is the temperature of the air in the tire? (Assume that the volume of the tire has not changed.)

Gases Q2. At STP, a mole of radon gas would contain _____ liters of gas. At STP, a 0.5 mole sample of krypton gas would contain _____ liters of gas.

Gases Q3. Five liters of air at -50°C is warmed to 100°C. What is the new volume if the pressure remains constant?

Gases Q4. Distinguish between Boyle's law, Charles's law and Gay-Lussac law?

1. Identify the following as an extensive or an intensive property

Property	Extensive or Intensive
Mass	
volume	
density	
color	
Viscosity (how "thick" a liquid is)	

2. Draw a picture at the molecular level of a solid, a liquid and a gas.

Molecular/Empirical Formulas: Q1. What is the difference between empirical and molecular formulas?

Q2. Determine the **molecular** formula for a compound that contains 12.2-g Nitrogen, 27.8-g Oxygen, and a molecular mass of 92.0 g/mol.

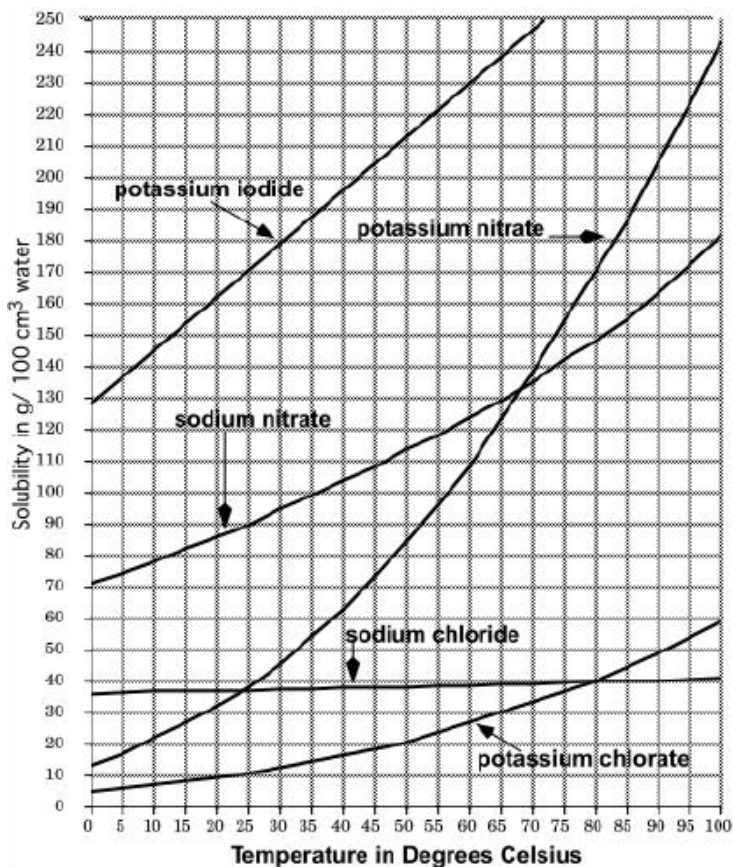
Solutions Q1. What is the difference between a solute, solution and a solvent? Discuss these terms in relation to ionic, polar and nonpolar compounds.

Solutions Q2. Define Molarity.

Solutions Q3: A sample of 3.75 moles of sodium bicarbonate is dissolved in 260 mL of water. What is the solution's molarity?

Solutions Q4: What is a colligative property? Give two examples.

Solutions Q5. You have a solution of sodium nitrate containing 140 g at 65° C. Is the solution saturated, unsaturated, or supersaturated? Use the diagram below:



Thermo Q1: A 75.0g sample of a metal at 98.0° C is dropped into a container of 350. g of water at 24.0°C, The final temperature is 24.5 °C. What is the specific heat of the metal?

Substance	Heat Capacity (J/g°C)	Substance	Heat Capacity (J/g°C)
Water	4.18	Grain Alcohol	2.4
Ice	2.1	Steam	1.7
Chloroform	0.96	Aluminum	0.90
Glass	0.50	Iron	0.46
Silver	0.24	Mercury	0.14
Lithium	0.14	Copper	0.39
Uranium	0.12	Gold	0.13

Thermo Q2: Using you knowledge from the exo/endo thermic reaction probe lab, draw two graphs to represent both end and exothermic reactions. Be sure to label the axes and indicate the activation energy.